



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/038,125	01/02/2002	Geon Choe	SJO920010040US1	7458

7590 09/22/2003

David W. Lynch
Crawford & Maunu PLLC
1270 Northland Drive
Suite 390
Mendota Heights, MN 55120

EXAMINER

OMETZ, DAVID LOUIS

ART UNIT	PAPER NUMBER
----------	--------------

2653

DATE MAILED: 09/22/2003

8

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/038,125

Applicant(s)

CHOE, GEON

Examiner

David L. Ometz

Art Unit

2653

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-14 is/are rejected.
- 7) ☒ Claim(s) 2 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

Art Unit: 2653

1. Applicant's election without traverse of Group I, claims 1-14 in Paper No. 8 is acknowledged.
2. Claims 1, 12, 13 are objected to because of the following informalities: in claim 1, line 1, --a-- should be inserted before "magnetic"; in claim 1, line 1, --a-- should be inserted before "NiMn"; in claim 12, line 1, --the-- should be inserted before "at"; in claim 12, line 2, "a NiMn" should be changed to --the NiMn--; in claim 13, line 1, --the-- should be inserted before "at".
Appropriate correction is required.
3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
4. Claims 1, 3-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 10-256621 in view of Journal of Applied Physics article "Oxygen as a surfactant in the Growth of Giant Magnetoresistive Spin Valves" to Egelhoff et al (hereinafter "Egelhoff"). JP '621 shows a method for providing precise control of magnetic coupling field in NiMn top spin valve head (see col. 2, line 37 for permissible antiferromagnetic materials, specifically "NiMn"), comprising: forming at least one copper layer (3 or 5) in a NiMn top spin valve; and depositing remaining layers (free layer 4, pinned layer 6, and antiferromagnetic layer 7) of the NiMn top spin valve head. However, JP'621 does not show the copper seed 3 and the copper spacer layer 5 being partly oxidized with oxygen. Egelhoff disclosed a spin valve head that oxidizes the copper spacer layer to greatly enhance the magnetoresistive effect (see pages 6144-6147). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to

Art Unit: 2653

oxidize the copper layers in the spin valve of JP'621 as taught by Egelhoff as doing this would enhance the GMR effect over that of a non-oxidized spin valve head, and would increase the beneficial specular reflection of electrons by creating a smoother or more well ordered growth pattern of the layers as taught by Egelhoff. It is noted that with regard to the dependent claims 3, 4, 6, 7, 12, and 13, the various gains in the spin valve performance (e.g. claim 3-- reduces the ferromagnetic coupling field without deteriorating GMR effect or resistance; claim 4-- provides a negative coupling field without affecting GMR effect or resistance;; claim 7-- provides stronger growth of NiFe(111) and NiMn(111) with respect to NiFe(200) and NiMn(002) phases; claim 12--provides an approximately 15% increase in amplitude of the output of a NiMn spin valve head at the same coupling field; claim 13-- does not affect asymmetry performance) would all be inherent in oxidizing the copper layers in the JP'621 reference as the structure is the same as Applicant's NiMn top spin valve.

5. Claim 2 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

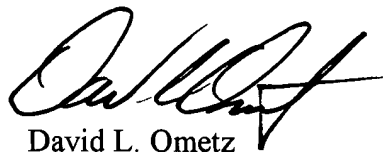
6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. JP 9-275233 shows a NiMn top spin valve head while Carey et al and EP 1124273 both show the use of CuO in spin valve heads.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David L. Ometz whose telephone number is (703) 308-1296. The examiner can normally be reached on M-F, 6:00-3:00.

Art Unit: 2653

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Korzuch can be reached on (703) 305-6137. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4750.



David L. Ometz
Primary Examiner
Art Unit 2653

DLO
9/15/03